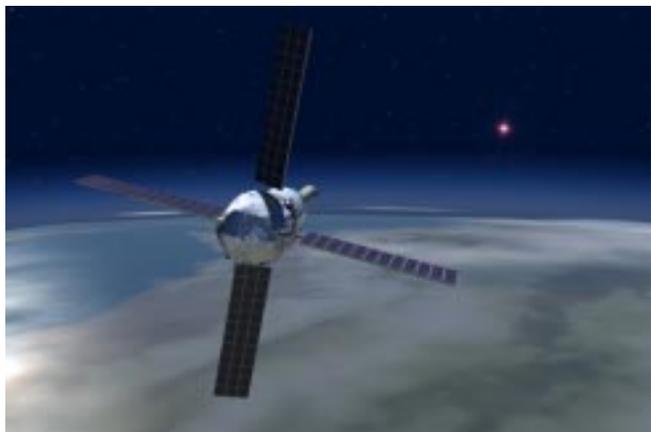


MARSHALL STAR

Serving the Marshall Space Flight Center Community

Oct. 23, 2003



An artist's concept of Gravity Probe B in orbit.

Gravity Probe B processing on target for Dec. 6 launch

by Jonathan Baggs

Engineers are continuing processing operations of Gravity Probe B and its Delta II launch vehicle toward a Dec. 6 liftoff at Vandenberg Air Force Base in California.

Launch is scheduled for 7:52 p.m. CST.

Gravity Probe B will test two predictions of Albert Einstein's general relativity theory that he advanced in 1916 – the geodetic effect of how space and time are warped by the

See *Gravity Probe B* on page 5

Marshall Imaging Services

New NASA facility will help protect space crews from radiation

by Tracy McMahan

Imagine a human spacecraft crew voyaging through space. A satellite sends a warning; energetic particles are being accelerated from the sun's

corona, sending dangerous radiation toward their spacecraft, but the crew isn't worried.

Long before the crew's journey, researchers on Earth conducted experiments to accurately measure the hazards of

space radiation and developed new materials and countermeasures to protect them.

To ensure the safety of spacecraft

See *Radiation* on page 4

Students, faculty contribute to science at NASA research center

by Sherrie Super

Not many 19-year-olds can say they've researched methods for protecting Earth from asteroids. But thanks to a summer internship at the National Space Science and Technology Center (NSSTC) in Huntsville, Rakia Law, a sophomore at Alabama A&M University in Huntsville, can truthfully make that claim.

More than 40 students and university professors from across the nation participated in summer research programs at the research center, a partnership between the Marshall Center, industry and Alabama's

See *Science* on page 9



Photo by David Higginbotham, NASA/Marshall Center

Helping to inspire the next generation

NASA Deputy Associate Administrator for Education Programs Dr. Clifford Houston tells children at the U.S. Space & Rocket Center in Huntsville that their dreams can become reality through education and hard work. During a recent visit, Houston toured the Marshall Center and took time out to speak to the children at the museum.

America works best when all Americans work

Each year, October is designated “National Disability Employment Awareness Month.” The month-long recognition evolved out of a campaign that began in 1945 during the Truman administration.

The 2003 theme is, “America Works Best when all Americans Work,” with a focus on awareness, employment and abilities. The 2003 theme was selected and announced by U.S. Secretary of Labor Elaine L. Chao. In May, Secretary Chao urged an international audience of disability experts to “continue to bring focus and awareness to solutions that insure the full inclusion of persons with disabilities into the 21st century work force.”

According to the 2000 census, approximately 50 million people with disabilities live in the United States — one out of every five persons. Translated into work force terms, it is conceivable that one out of every five members of our

Director's Corner



Photo by Doug Stoffer, NASA/Marshall Center

King team has an open or hidden disability.

At Marshall, we support and echo Secretary Chao’s message through our Core Values, which “serve as the principles that guide our decisions and

behavior.” Within these Values we appreciate people as our “greatest strength.” Part of valuing people is valuing and recognizing the diversity that makes up our Marshall Team. Diversity goes beyond ethnicity, traditions, beliefs, and backgrounds. It is about appreciating each other as individuals and using all of our strengths to achieve our objectives.

I want to encourage the Marshall Team to learn more about “National Disability Employment Awareness Month.” There are excellent Web sites available to all of us. The U.S. Department of State hosts a Web site dedicated to International Information Programs regarding disabilities at <http://usinfo.state.gov/usa/able/>. Another source is “Ability Magazine” at <http://www.abilitymagazine.com/>. Logon today and learn more about the persons who are part of the talented circle we call the “Marshall Team.”

— **David King**
Marshall Center Director

Marshall team member to speak on disabilities, personal experience

by Jonathan Baggs

Managers and team leads at the Marshall Center are invited to hear a presentation and personal story from David Brock, Marshall’s industry assistance officer, from 2:30-4 p.m. Oct. 30 in the Bldg. 4200 10th-floor conference room.

Brock’s topic will be “Win Win Means If I Help You Win, I Win Too.”

At the age of 21 in 1973, Brock was diagnosed with a condition that would lead to blindness within 10 years. By the end of 1982, he had completely mainstreamed into a life without vision.

Brock says the greatest challenge facing the disabled is not the disability itself, but other people’s perception of the disability.

Brock also serves on the Board of Governors of the Alabama Department of Rehabilitation Services. The department’s mission is to help the disabled population in Alabama.

More than 49 million Americans are classified as disabled, or 19 percent of the U.S. population. More than 65 percent are unemployed -- and that number is growing, according to Brock.

“All the disabled need is someone to care, someone to reach out and lend a helping hand, someone to step up to the task and become a mentor,” Brock said. “We can never fully reach our potential until we first reach out and help others reach their potential. So many today need that helping hand.”

The writer, an employee of ASRI, is the Marshall Star editor.



Photo by David Higginbotham, NASA/Marshall Center

New handicap ramp open

A new handicap ramp is open leading from the visitor parking lot to the front of Bldg. 4200.

By the President of the United States of America, a proclamation for Americans with disabilities

October is National Disability Employment Awareness Month

from the White House

Employment is vital to independence, empowerment and quality of life.

During National Disability Employment Awareness Month, we recognize the many contributions citizens with disabilities make to our society, and we reaffirm our commitment to helping them achieve their full inclusion in our workforce.

Today, Americans with disabilities enjoy improved access to education, government services, public accommodations, transportation, telecommunications, and employment opportunities. The landmark Americans with Disabilities Act of 1990 (ADA) removed barriers and enabled many individuals with disabilities to find more opportunities to use their gifts and talents in the workplace. This progress has made our nation stronger, more productive, and more just. People with disabilities still encounter challenges, however, to their full participation in American society.

In February 2001, I launched the New Freedom Initiative to address these challenges, to fulfill the promises of the ADA, and to move toward an America where all our citizens live and work with

dignity and freedom. This comprehensive plan is helping Americans with disabilities learn and develop skills, engage in productive work, make choices about their daily lives, and participate fully in their communities.

A key component of the New Freedom Initiative is our commitment to integrate individuals with disabilities into the workforce. We have made substantial progress toward this goal.

The Department of Justice has established an ADA Business Connection, a series of meetings between representatives of the business and disability communities to open dialogue that will promote greater understanding and increased voluntary compliance with the ADA. Also, the Department of Health and Human Services and the Social Security Administration are implementing the landmark "Ticket to Work" program that makes it possible for millions of Americans with disabilities to no longer have to choose between having a job and receiving health care. And the Department of Labor has established two national technical assistance centers on workforce and disability that offer training, technical assistance and information to improve

access for all in the workforce development system.

By working together to open doors of opportunity for citizens with disabilities, we can help fulfill the promise of our great nation. To recognize the contributions of Americans with disabilities and to encourage all citizens to help ensure their full inclusion in the workforce, the Congress, by joint resolution approved Aug. 11, 1945, as amended (36 U.S.C. 121), has designated October of each year as "National Disability Employment Awareness Month."

NOW, THEREFORE, I, GEORGE W. BUSH, President of the United States of America, do hereby proclaim October 2003 as National Disability Employment Awareness Month. I call upon government officials, labor leaders, employers, and all the people of the United States to observe this month with appropriate programs, ceremonies and activities.

IN WITNESS WHEREOF, I have hereunto set my hand this third day of October, in the year of our Lord two thousand three, and of the Independence of the United States of America the two hundred and twenty-eighth.

— *George W. Bush*
President, United States of America

NASA celebrating Diversity Awareness Month

from NASA Headquarters

During the month of October, NASA joins other agencies and organizations throughout the United States in celebrating Diversity Awareness. This month provides all of us with an opportunity to salute our nation's rich cultural diversity.

As we work to transform NASA and to advance our Agency's important work for our nation, we realize that it is only possible through the strength and determination of our people and the diversity that they represent. NASA greatly benefits from the diversity of its work force in many forms such as various backgrounds, professional paths, thoughts, ideas, perspectives, cultural heritages, religious beliefs, languages, dialects, talents, and abilities. Each employee at NASA contributes something unique and special toward NASA's challenging vision, "To

improve life here, To extend life to there, To find life beyond."

With this in mind, I encourage each of you to recognize and utilize the unique talents and contributions of fellow NASA team members.

Each Center provides an opportunity to experience and celebrate diverse cultures through diversity and heritage celebrations. If you would like to learn more about Diversity Awareness, please contact your Center's Office of Equal Opportunity Programs, which stands ready to assist in related equal opportunity and diversity matters.

As we move forward to Return to Flight and achieving the NASA vision, I would ask that you join me in paying tribute to the diversity of our NASA family as we celebrate October as Diversity Awareness Month.

— *Sean O'Keefe*
NASA Administrator

Radiation

Continued from page 1

crews, NASA biologists and physicists will perform thousands of experiments at the new \$34 million NASA Space Radiation Laboratory (NSRL) commissioned today at the Department of Energy's Brookhaven National Laboratory in Upton, N.Y. The laboratory, built in cooperation between NASA and the Department of Energy, is one of the few facilities that can simulate the harsh space radiation environment.

"Scientists will use this facility as a research tool to protect today's crews on the International Space Station and to enable the next generation of explorers to safely go beyond Earth's protected neighborhood," said Guy Fogleman, director of the Bioastronautics Research Division in the Office of Biological and Physical Research at NASA Headquarters in Washington.

Space radiation produced by the sun and other galactic sources is more dangerous and hundreds of times more intense than radiation sources, such as medical X-rays or normal cosmic radiation, usually experienced on Earth. When the intensely ionizing particles found in space strike human tissue, it can result in cell damage and may eventually lead to cancer.

Approximately 80 investigators will conduct research annually at the new facility.

"The (laboratory) will enable us to triple the ability of researchers to perform radiobiology experiments and the resulting science knowledge," said Frank Cucinotta, the program scientist for NASA's Space Radiation Health Project at Johnson Space Center in Houston. "Scientists at universities and medical centers across the nation will use the facility to investigate how space radiation damages cells and tissues such as the eyes, brain and internal organs."

For each experiment, an accelerator produces beams of protons or heavy ions. These ions are typical of those accelerated in cosmic sources and by the sun. The beams of ions move through a 328-foot transport tunnel to the 400-square-foot shielded target hall. There, they hit the target, which may be a biological sample or shielding material.

"Physicists will measure how specific particles interact with shielding material," said James Adams, the program scientist for the Space Radiation Shielding Program at the Marshall Center. "We can use this knowledge to improve our ability to predict the effectiveness of various materials and to develop and test new materials."

At the NASA Space Radiation Laboratory, the radiation health



Photo by Doug Stoffer, NASA/Marshall Center

Dr. Raj Kaul examines "bricks" of radiation shielding material made in the Composites Laboratory at the Marshall Center. Kaul, a member of the Space Radiation Shielding Program team, is investigating the effectiveness of material used to shield spacecraft from harmful space radiation.

team will perform extensive tests with biological samples placed in the path of the radiation. They will use the information to understand mechanisms of radiation damage to cells, predict risks, and develop countermeasures that mitigate radiation effects.

"Advances in radiation detection, shielding and other radiation-mitigation techniques may be applied to workers in space and on Earth and may lead to improved use of radiation to treat disease on Earth and prevent radiation-induced illnesses," Fogleman said.

Since the 1970s, NASA has been using particle accelerators to understand and mitigate the risks of space radiation. The NASA Space Radiation Laboratory will take advantage of the high-energy particle accelerators at Brookhaven National Laboratory, a Department of Energy facility established in 1947. Construction of the new facility began in 1998, and was funded in part by NASA's Office of Biological and Physical Research.

The writer, an employee of ASRI, supports the Media Relations Department.

Energy Tip

Energy tips are reminders that we all need to be energy conscious, both at home and at our workplace. NASA has been directed to implement cost-effective energy efficiency, renewable energy, and water conservation measures in Agency facilities and operations. The cooperation of each employee is needed in this effort. Please be a supporter by becoming a good steward of energy conservation. Turn off lights and other power consumers under your control when you leave the workplace.

Gravity Probe B

Continued from page 1

presence of Earth; and “frame dragging,” or how the Earth’s rotation drags space and time around with it. The Marshall Center, Stanford University, and Lockheed Martin developed the mission.

The 18-month mission will check tiny changes in the direction of spin of four gyroscopes contained in Gravity Probe B as it orbits the Earth directly over the poles, 400 miles high. The gyroscopes are so precise that they will provide an almost perfect space-time reference system.

Electrical testing on the satellite was completed last week and testing of the Super Quantum Interference Device (SQUID) readouts are continuing this week. The SQUID has ultra-sensitive magnetometers that can detect a change in the tilt of a spinning gyroscope to an angle

of 0.1 milliarc-seconds, which is equivalent to viewing the width of a human hair at 100 miles.

Solar array installation is scheduled to begin next Monday.

The Delta II launch vehicle is on the launch pad and integrated vehicle testing began Oct. 14. A qualification test in a helium environment was set for Wednesday on the Redundant Inertial Flight Control Assembly – a navigation and guidance control unit for the launch vehicle. Since Gravity Probe B will be venting helium inside the launch vehicle’s fairing during countdown and in flight, engineers want to know what effect, if any, this environment could have on the flight control assembly.

Next week, NASA engineers will perform a routine check of the vehicle’s

integrated guidance and control system.

An exercise that involves loading liquid oxygen aboard the Delta II first stage and a limited “minus count” will be conducted Nov. 4. The following day, engineers will perform a simulated flight test – a “plus count” – that tests the launch vehicle systems as if the vehicle were in powered flight.

In final launch preparation activities, Gravity Probe B will be transported to Vandenberg’s Space Launch Complex 2 on Nov. 19 and hoisted atop the Delta II second stage, followed the next day by the Flight Program Verification – the final major test before launch. The Delta II fairing will be installed around the spacecraft on Nov. 25.

The writer, an employee of ASRI, is the Marshall Star editor.

Skylab 30th anniversary events set Nov. 10 in Huntsville

from the Government and Community Relations Department

On Nov. 10, the North Alabama community will celebrate the 30th anniversary of Skylab — America’s first space station.

Eight of the nine astronauts who flew aboard Skylab will be in Huntsville to help commemorate the three historic missions.

Anniversary events include:

☛ Education outreach sessions with the astronauts in area schools, including Huntsville City Schools, Madison County and Madison city schools, via distance learning facilities, and to schools statewide by Web cast.

☛ Lunch with Marshall team members at the Marshall Center at noon. Location and details to be announced.

☛ The 16th Von Braun Forum at 2 p.m. in the Chan Auditorium in the Administrative Science Building on the campus of the University of Alabama in Huntsville. This year’s forum will feature a 30th anniversary Skylab video and panel discussions of the science performed aboard Skylab, the rescue of Skylab, and the world records set during the three missions. The event is open to the public and admission is free.

☛ At the conclusion of the Von Braun Forum, a Skylab collection will be dedicated in the lobby of the UAH Salmon Library.

☛ The astronauts also will participate in a 30th anniversary Skylab video and panel

discussion in the IMAX Theater of the U.S. Space & Rocket Center at 5:30 p.m., followed by a reception in the museum at 7 p.m.

The Space & Rocket Center events are open to the public and cost is \$20 for the reception and \$40 for the reception and IMAX Theater event. Reservations to the evening events can be made online at www.hsvchamber.org, by calling 1-256-535-2031, by e-mail at tleopold@hsvchamber.org, or by mail to the Chamber of Commerce, Attn: Government Affairs, P.O. Box 408, Huntsville, AL 35804.



Learning about energy conservation

Marshall’s Energy Program Manager Cedreck Davis, left, gives practical tips for energy conservation to, from left, Janie Crawford, Allan Longhi and Shannon Raleigh. The energy team’s exhibits were on display last week in the Bldg. 4200 lobby.

Photo by Doug Stoffer, NASA/Marshall Center

Science Directorate Employee Appreciation

More than 370 members of the Marshall Center's Science Directorate attended the recent Employee Appreciation Day at Rustic Lodge on Redstone Arsenal.

The annual event is held to celebrate accomplishments, show employee appreciation and recognize significant contributions to the Science Directorate's successes during the past year.

Science Directorate Director Dr. Ann Whitaker presented awards in several categories, including:

- Marshall Group Achievement Award to JWST/AMSD Mirror Technology Development Team comprised of more than 70 Marshall team members.

- Science Excellence awards were presented in three categories: Best Peer Reviewed Science Paper; implementing process improvements or innovative techniques in Business and Administration; and for implementing process improvements or innovative techniques in Engineering and Project Management.

- People, Customers, Excellence, Teamwork and Innovation awards were presented to more than 50 team members for notable demonstration of at least one of the Marshall Center's Core Values in performance of daily responsibilities.

- Awards were presented to more than 20 individuals and teams for significant contributions to Safety and Quality.



Dr. Ann Whitaker signs a commemorative poster.

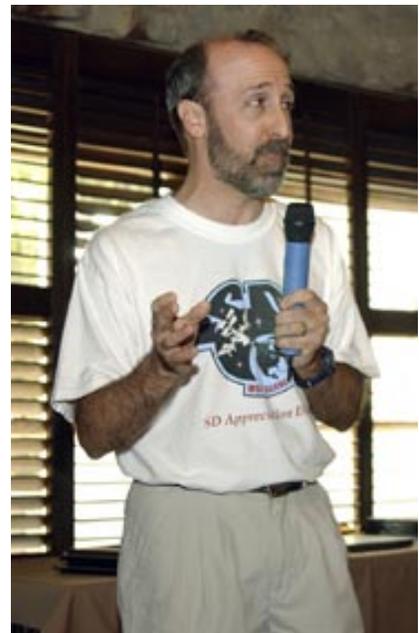


All photos by Adeline Byford

It's fun and fellowship for these Science Directorate employees.



Taking a little hike are, from left, Mark Nall, Jane Holland, Bob Crull and Richard Grugel.



Steve Lambing serves up comedy as a side dish to barbecue and cake.

Day blends nature, awards and entertainment



Marshall Safety Action Team members, right, organize a rousing game of "Safety Jeopardy."



You can't have too much sauce on barbecue as team members line up for food.



Tom Fleming, left, is master of ceremonies as Myscha Crouch, center, receives a door prize from Pat Puckett, right. The prize is an original painting by Marshall team member Caroline Wang.



Life is on the rocks for these Science Directorate team members as they enjoy lunch.



Lunch is served for, from left, Dave Cockrell, Tom Smith, Andy Linskey, Wendell Elrod and Bill Patterson.



"Slim and the Teardrops," all members of the Marshall team, perform for the crowd. Band members are, from left, Bill Ledbetter, Ladd Lewis, Ron Unger and John Isom.

Close encounters of the stellar kind

from the Smithsonian's Chandra X-ray Center

NASA's Chandra X-ray Observatory has confirmed that close encounters between stars form X-ray emitting, double star systems in dense globular star clusters.

These X-ray binaries have a different birth process than their cousins outside globular clusters, and should have a profound influence on the cluster's evolution.

A team of scientists led by David Pooley of the Massachusetts Institute of Technology in Cambridge took advantage of Chandra's unique ability to precisely locate and resolve individual sources to determine the number of X-ray sources in 12 globular clusters in our Galaxy. Most of the sources are binary systems containing a collapsed star such as a neutron star or a white dwarf star that is pulling matter off normal, Sun-like companion star.

"We found that the number of X-ray binaries is closely correlated with the rate of encounters between stars in the clusters," Pooley said. "Our conclusion is that the binaries are formed as a consequence of these encounters. It is a case of nurture not nature."

A similar study led by Craig Heinke of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass. confirmed this conclusion, and showed that roughly 10 percent of these X-ray binary systems contain neutron stars. Most of these neutron stars are usually quiet, spending less than 10 percent of their time actively feeding from their companion.

A globular cluster is a spherical collection of hundreds of thousands or even millions of stars buzzing around each other in a gravitationally-bound stellar beehive that is about a hundred light years in diameter. The stars in a globular cluster are often only about a tenth of a light year apart.

For comparison, the nearest star to the Sun, Proxima Centauri, is 4.2 light years away.

With so many stars moving so close together, interactions between stars occur frequently in globular clusters. The stars, while rarely colliding, do get close enough to form binary star systems or cause binary stars to exchange partners in intricate dances. The data suggest that X-ray binary systems are formed in dense clusters known as globular clusters about once a day somewhere in the universe.

Observations by NASA's Uhuru X-ray satellite in the 1970s showed that globular clusters seemed to contain a disproportion-



Photo by Emmett Given, NASA/Marshall Center

Marshall team members meet 'therapy' partner

Therapy Partners' volunteer Jean Greenwood, left, holds "Murphy" while Marshall team members, from left, Tammy Townsend, Anne Garber and Robin Pinson learn about animal-assisted therapy. The group was part of a recent Combined Federal Campaign bus tour to familiarize Marshall team members with area agencies that depend on donations to help the community. Therapy Partners is made up of volunteer teams of trained animal handlers who visit patients throughout North Alabama who need animal-assisted therapy to help regain physical, emotional, social and mental health. The Marshall Center's CFC goal is \$500,000 during the six-week campaign. With about three weeks to go, Marshall contributions total just over \$300,000.

ately large number of X-ray binary sources compared to the Galaxy as a whole. Normally only one in a billion stars is a member of an X-ray binary system containing a neutron star, whereas in globular clusters, the fraction is more like one in a million.

The present research confirms earlier suggestions that the chance of forming an X-ray binary system is dramatically increased by the congestion in a globular cluster. Under these conditions two processes, known as three-star exchange collisions, and tidal captures, can lead to a thousand-fold increase in the number of X-ray sources in globular clusters.

In an exchange collision, a lone neutron star encounters a pair of ordinary stars. The intense gravity of the neutron star can induce the most massive ordinary star to "change partners," and pair up with the neutron star while ejecting the lighter star.

A neutron star could also make a grazing collision with a single normal star, and the intense gravity of the neutron star could distort the gravity of the normal star in the process. The energy lost in the distortion, could prevent the normal star from escaping from the neutron star, leading to what is called tidal capture.

"In addition to solving a long-standing mystery, Chandra data offer an opportunity for a deeper understanding of globular cluster evolution," Heinke said. "For example, the energy released in the formation of close binary systems could keep the central parts of the cluster from collapsing to form a massive black hole."

Science

Continued from page 1

research universities. While Law studied asteroids, other visiting researchers tackled projects ranging from meteorological research to improving astronaut gloves.

Law's experience is part of NASA's Equal Opportunity Summer Scholars Internship Program, which pairs minority and disabled college students with NASA researchers and engineers as mentors. Through the Minorities in Science and Engineering Program, she spent 10 weeks working with Dr. Jonathan W. Campbell, a NASA astrophysicist and space scientist who researches advanced projects, technologies and concepts for future NASA missions at the National Space Science and Technology Center.

Among these projects is protecting Earth from asteroids and other space-borne objects.

"There's a significant number of asteroids that may pose a potential danger to Earth," Law said. "I spent the summer researching these objects and exploring methods — such as deflecting them with lasers — to prevent them from impacting our planet."

Another summer researcher, Patrick V. Hull, focused on friction modification. A doctorate student from Tennessee Technological University in Cookeville, he used a prototype miniature actuator, a mechanical device about the size of a dime, to change the surface roughness of a wide array of materials. Then, he determined which surfaces have better gripping abilities.



Photo by Emmett Given, NASA/Marshall Center

Rakia Law, left, a sophomore at Alabama A&M University in Huntsville, reviews a model for an asteroid orbit-shaping concept for protecting the Earth with Dr. Jonathan Campbell, right. Campbell is a Marshall astrophysicist at the National Space Science & Technology Center in Huntsville.

"A potential benefit of this research," Hull said, "is the possibility it could help improve materials used for astronaut gloves — and eventually give astronauts a better grip during Extra Vehicular Activities, more commonly called space walks."

Hull, who has bachelor's and master's degrees in mechanical engineering from Tennessee Technology University, believes the most beneficial part of his summer experience is interacting with scientists who perform groundbreaking research every day. "This has given me the chance to work with some very creative and strong technically minded people here at NASA," he said.

The summer research is supported by programs ranging from NASA education

initiatives such as the Summer High School Apprenticeship Research Program and NASA Faculty Fellowship program to Universities Space Research Association internships and other programs sponsored by Alabama research universities.

Focusing on space science, earth science, materials science, biotechnology, propulsion, information technology and advanced optics and energy technology, collaboration at the NSSTC enables scientists, engineers and educators to share research and other facilities.

More information on the National Space Science and Technology Center is available at: www.nsstc.org.

The writer, an employee of ASRI, supports the Media Relations Office.

Job Announcements

MS04D0020, AST, Experimental Facilities Development. GS-0801-13, Center Operations Directorate, Facilities Engineering Department. Closes Oct. 27. Contact: Dana Blaine at 544-7514.

MS04C0022, Administrative Officer. GS-0341-07, 09, Engineering Directorate, Office of the Director. Closes Oct. 24. Contact: Rita Evans-McCoy at 544-7507.

MS04D0023, AST, Data Systems. GS-0854-13, Engineering Directorate, Avionics Department. Closes Oct. 24.

Contact: Allan Day at 544-4079.

MS04D0024, AST, Liquid Propulsion Systems. GS-0861-07, Space Transportation Directorate, Vehicle & Systems Development Department. Closes Oct. 24. Contact: Jim Bramblett at 544-3398.

MS04D0025, AST, Fluid Mechanics. GS-0861-13, Space Transportation Directorate, Subsystems & Component Development Department. Closes Oct. 27. Contact: Jim Bramblett at 544-3398.

MS04D0026, AST, Aerothermodynamics. GS-0861-13, Space Transportation

Directorate, Subsystems & Component Development Department. Closes Oct. 27. Contact: Jim Bramblett at 544-3398.

MS04D0027, AST, Flight Vehicle Space Environments. GS-0861-13, Engineering Directorate, Engineering Systems Department. Closes Oct. 29. Contact: Dana Blaine at 544-7514.

MS04D0028, AST, Liquid Propulsion Systems. GS-0861-11, 12, Space Transportation Directorate, Vehicle & Systems Development Department. Closes Oct. 30. Contact: 544-3398.

Marshall establishes Nursing Mothers' Program

Lactation rooms being provided in Center buildings

By Billie Swinford and Rebecca Farr

In order for new mothers to be able to continue to supply milk for their babies, a new program – the Nursing Mothers' Program – has been established at the Marshall Center.

The program came to fruition through a suggestion to establish lactation rooms at the Center.

As a large employer that must recruit and retain a strong and diverse work force, the Marshall Center supports nursing mothers who want to continue lactation after they return to work following maternity leave.

According to the U.S. Department of Agriculture, and other sources, many benefits result from breast-feeding, including strong, early bonding with the child, fewer ear and respiratory infections in young children, increased protection against Sudden Infant Death Syndrome, enhanced auto-immune system development, lower mortality rate for infants and fewer food allergies.

Other benefits for the mother include reduced incidences of breast and ovarian cancer, reduced medical costs for mother and baby, less time missed from work because of poor infant health and significant monetary savings in buying prepared formula.

Lactation rooms are now currently available at the following buildings at the Marshall Center:

- 4663, Room A-270
- 4487, Room B-100L
- 4583, Room 158

- 4203, Room 2433
- 4610, Room 3040
- 4200 basement women's restroom
- 4755, Room 108
- 4623, Room 105
- Medical Center, Room 151A
- Intergraph Building 11, Room 12

As future buildings — including the new Marshall Child Development Center — are planned and built, lactation rooms will be included in the designs.

Building managers were briefed about the Nursing Mothers' Program in June. A meeting was held in September to kick-off the program and to solicit volunteers to assist in monitoring the rooms. Meetings are planned quarterly to provide information about the Nursing Mothers' Program.

Additional information can be found at: <http://eo.msfc.nasa.gov/sep.html>. If you need further assistance or would like to volunteer to assist in the program, call Billie Swinford at 544-0087.

Billie Swinford is the Affirmative Employment Program manager and Federal Women's Program manager at the Marshall Center. Rebecca Farr works in the Measurements Group of the Test Evaluation Department in the Transportation Directorate at Marshall.

NASA SES Candidate Development Program open until Nov. 7

The NASA Senior Executive Service Candidate Development Program is accepting applications until Nov. 7.

The program is for GS-14 and GS-15 federal employees who have potential for assuming executive responsibilities. The program can be completed on a part-time basis during a 12-18 month period.

Applicants must apply on "NASA Stars." If a resume is already on file, apply through "Quick Apply." Required supplemental information can be provided in the "Other Information" section of Resume Builder. For information, call Deidra Williams at 544-5721.



Photo by Charles Dischinger

Jennings wins Fitness Center membership

Julie Sanchez, left, chair of the Wellness and Ergonomics Committee of the Marshall Safety, Health and Environmental team, presents a free three-month membership to Marshall's Fitness Center to Katie Jennings, a Teledyne Brown employee in Marshall's Science Directorate. Jennings' name was drawn from random entrants for the prize at Marshall's recent Safety Day activities.

Center Announcements

SLTS design and operations workshop is Nov. 17-19

A Space Launch and Transportation Systems Design and Operations workshop will be Nov. 17-19 at the Marshall Center in Bldg. 4200, Room G-13E. The course is for space professionals who produce, operate and use cost-effective space launch and transportation systems. The workshop's focus is technical risk identification and mitigation in the most cost-effective manner, while maintaining technical integrity of a vehicle and infrastructure. For more information, see "Inside Marshall."

Marshall conducting controlled equipment inventory

A 100 percent physical inventory of all controlled NASA bar-coded equipment is underway. The scanning schedule is at <http://inv2002.msfc.nasa.gov/inv2003/>. For more information, call Robbie Saint at 544-9618.

MARS Dance Club classes held each Monday night

The NASA MARS Dance Club has intermediate and beginner ballroom dance classes starting at 7 p.m. and 8 p.m., respectively, every Monday at St. Stephens Episcopal Church on Whitesburg Drive in Huntsville. For more information, call Jerry Maxwell at 544-1954.

Discount circus tickets available for Marshall team members

Marshall team members can receive a \$3.50 discount on seats in the box and mezzanine sections when the Ringling Brothers and Barnum & Bailey Circus perform Dec. 3-7 at the Von Braun Center. Tickets go on sale at the Von Braun Center on Oct. 23. Marshall team members should show their identification badges to receive the discount. For more information, see "Inside Marshall."

American Chemical Society to meet Monday

The North Alabama Section of the American Chemical Society will

meet at 6 p.m. Monday at the Decatur Holiday Inn on U.S. 31 South at Alabama 20 West just across the Tennessee River bridge. For more information, call Dr. Rudy Gostowski at 544-0458.

Shuttle Buddies meet Monday

The Shuttle Buddies will meet at 8:30 a.m. Monday at Shoney's on University Drive at Memorial Parkway in Huntsville. For more information, call Deemer Self at 881-7757.

MARS Tennis Club Doubles Tournament is Saturday

The MARS Tennis Club will host a Hi-Lo Closed Doubles Tournament at 8 a.m. Oct. 25. Participants will be matched with a doubles partner at the tournament, which is for MARS Tennis Club members only. For more information, call Ronda Moyers at 544-6809.

Big Brothers-Big Sisters event set for Nov. 14-16

The Big Brothers-Big Sisters annual fund-raising campaign this year features "Bowl for Kids Sake" on Nov. 14-16 at Monarch Lanes on Bob Wallace Avenue in Huntsville. For more information, call 880-2123 or go to www.bbb-sna.com or call Teresa A. Foley-Batts at 544-0335.

ISS command ceremony to be broadcast on NASA TV Friday

NASA TV will carry the change-of-command ceremony onboard the International Space Station in a live broadcast at 1 p.m. CDT Friday. Russian cosmonaut Yuri Malenchenko and NASA astronaut Ed Lu will hand over command of the orbiting laboratory to Expedition Eight crew members astronaut Michael Foale and cosmonaut Alexander Kaleri. The Expedition Eight crew will spend six months in orbit. Pedro Duque of the European Space Agency also is onboard the station, having arrived with Foale and Kaleri and will return to Earth with the Expedition Seven crew on Monday.

HEDS course nomination forms due Nov. 24

Nomination forms for the Human Exploration and Development of Space course are due Nov. 24, or as soon as possible, to Georgann Freeman in CD20. The event, to be held Jan. 12-16, will be at Wallops Flight Facility in Virginia. For more information, see "Inside Marshall."

SOLAR e-Learning event set for Wednesday

Representatives of the Site for Online Learning and Resources and Marshall's Self-Study Learning Center will be holding an e-Learning exhibit from 11 a.m.-1 p.m. in the Bldg. 4203 cafeteria. For more information, call Tina Smith at 544-7834 or the Self-Study Learning Center at 544-8291.

MARS Basketball League season starting

The MARS Basketball League season is starting. To sign up or for more information, call Adrian Wilson at 544-3578.

Telephone system outage set for Friday-Sunday at Marshall

Upgrades to the Marshall voice switch network will cause outages and disruption to telephone equipment including faxes, modems, conference phones and paging systems beginning at 6 p.m. Friday-8 p.m. Sunday. For a list of affected buildings, see "Inside Marshall." For more information, call the NASA Information Support Center at 544-HELP, Option 0.

Obituaries

Ernest L. McMurtrey, 85, of Huntsville, died Oct. 19. He retired from the Marshall Center in 1985 where he worked as a materials engineer.

McMurtrey is survived by several children.

Classified Ads

Miscellaneous

- ★ Metal bunk beds, \$50. 513-0524
- ★ KitchenAid under-counter dishwasher, white front, \$50; Five ficus trees with or without containers. 881-6040
- ★ LazyBoy recliner, lumbar support, lifetime stain guard, mauve, \$200. 534-3252 lv. msg .
- ★ Large dog kennel, \$100. 256-772-7478
- ★ TI-83 graphing calculator w/link capabilities, \$35; Artist's drafting table, 30"x48" & chair, black, \$50. 256-721-0042
- ★ Faux rabbit fur coat, worn once, size 2X, \$150. 256-498-6580
- ★ Gateway CRT 17" monitor, on-screen controls, \$50. 765-532-4218
- ★ New boy's Mongoose Hoop-D stunt bike, \$65. 864-2629
- ★ Field fencing, 4' tall, nearly two rolls, 660', red-top, cut to 30' rolls, \$100. 256-461-8369
- ★ Frigidaire upright freezer, 17.1 cu. ft., manual defrost, \$175. 882-0947
- ★ Solid light wood dresser w/mirror and matching headboard and frame for full- size bed, \$150. 828-5326
- ★ Murray Go-cart, 5HP, single seater, \$210. 683-9364
- ★ Computer/roll-top desk, \$350; corner china cabinet, \$375; Cherry coffee/end tables, \$325. 859-4833
- ★ Bundle R19 insulation for 16" center, new, approx. 16 pieces 4' long, \$22. 256-461-8369
- ★ Samsung Maxima Zoom 33mm camera, 38-105mm, two macro modes, many features, \$25. 830-9156
- ★ RayBan "Aviator" sun glasses, new in box, never worn, green lenses, gold frames, \$50. 931-580-1553
- ★ French Provincial bedroom: white, double-bed w/ mattress, dresser w/mirror, chest, night table, \$400. 722-2146
- ★ Portable toilet for handicapped, never used, \$50; walker for handicapped, \$40; Steam buggy, \$75. 828-2178
- ★ 1983 Bateau fishing/runabout, 17.5', walk-thru windshield, 70HP, Evinrude, Skipper-B trailer, accessories. 883-8340
- ★ Hot tub, seats 3-4, all new controls, \$1,500. 772-0364
- ★ 1977 Avion travel trailer, 27', for hunting, camping or lake lot, \$4,900. 931-427-2059
- ★ Drop leaf wood table, 36"x48", laminated top, \$50. 256-881-5034
- ★ Hungarian hand-painted plates X4; two antique silver overlay plates; antiques hobnail sugar bowl. 882-6832

- ★ Oriental rug, approx. 8'x11', main color maroon, \$400. 539-3512
- ★ Green Bay Packers reversible jacket w/hood, never worn, size 18 youth, ladies petite, \$15. 880-7490
- ★ Three tickets, "Jesus Christ Superstar," front row center, Nov. 29, 2 p.m., VBC, \$41.50 each. 464-8353
- ★ Broadway Theatre League ticket, "Jesus Christ Superstar", Nov. 30, 2 p.m., front row, A12, \$42. 256-498-2028
- ★ Yamaha clarinet w/carrying case, \$200. 837-6797
- ★ Broyhill solid wood Walnut finish dining room set; table, hutch & six chairs, \$999. 539-2331
- ★ Oval engagement ring, 1 carat plus, \$650. 721-7799
- ★ PC, PAI energy saver w/Intel. 166mgz cpu, 96MB RAM, 1.8GB HD, 17" monitor, \$150. 880-9025
- ★ Antique Mahogany vanity desk & chair, \$200; Oak rocking chair, \$40; TV stand, \$25. 971-1414
- ★ Fisher 2-door wood burning stove, \$175; water heater, 40-gal., new unused, \$115. 881-8204
- ★ Roper washer, Hotpoint dryer, both for \$100. 256-587-0256
- ★ Samsung camcorder, compact and slim w/Easy-Q, new, \$150. 216-9282
- ★ Blue LaRoche teddy bear booster seat w/cover, washes easily, \$40. 468-5242
- ★ Palm V accessories kit, modem, charger, wireless web, GSM upgrade, cases, faceplates, \$20. 772-8489
- ★ Yamaha Grand Piano, ebony finish, 5'3", purchased in 1999, \$9,000. 931-625-0671
- ★ Combination roll-around grill/ice-chest, Grill2Go/Fire-N-Ice, never used, in box, \$125. 256-233-0705
- ★ Rickenbacker 4003 bass guitar w/hard case, papers, etc. Turquoise, white binding and chrome. \$985. 256-306-0700

- ★ 2000 Chevy Astro van, 24K miles, under warranty, captains chairs, all-power, dutch doors, \$10,500. 931-728-6337
- ★ 2002 Jeep Liberty Limited, moon-roof, CD, select track, 4x4, \$17,800. 931-4648
- ★ 1993 Suzuki Sidekick 4WD JX, 2-door convertible, approx. 130K miles, \$1,950. 851-8668
- ★ 1988 Ford Crown Victoria, 125K miles, one-owner, \$2,000. 881-1781
- ★ 1989 Mitsubishi Mighty Max Sport P/U w/85K miles, \$900. 461-7712/Ted
- ★ 1991 Explorer XLT, 4-door, leather, 64K miles, new fuel pump, radiator, etc., \$5,800. 880-6498
- ★ 1989 Plymouth Voyager van, \$500. 256-828-0685 leave message
- ★ 1998 Plymouth voyager, V6, 69K miles, power seat, luggage rack, running boards, \$7,500. 837-2267
- ★ 1972 Ford Bronco, 4x4, 302/V8, 3-speed, mud tires, hunting truck, \$1,650. 683-9364
- ★ 2000 Toyota Tundra, SR5 access cab, V8, auto, CD, toolbox, bedliner, 50K miles, \$16,900. 233-3407
- ★ 1997 Ford Explorer XLT, maroon, leather, power door locks, keyless entry, \$7,500. 721-7799
- ★ 1995 Mazda Protégé LX, 115K miles, 4-door, automatic, sparkle green, cruise control, moonroof, \$2,500. 829-0285
- ★ 1968 Mustang, 6-cyl., new transmission, brakes, carburetor, \$2,900. 922-9294
- ★ 1993 GMC van, V8, a/c, a/t, one-owner, 89K miles, new tires, \$4,000. 539-7857
- ★ 1980 Chevy truck, 93K miles, 350/V8, long wheel base, auto, air, power steering/brakes, \$2,500. 880-6254

Vehicles

- ★ 1997 Buick Park Avenue, one-owner, garage kept, 95K miles, many features, \$7,200. 828-4817lv. msg.
- ★ 2000 Mazda 626, 4-door, 41K miles, silver w/gray interior, PS/PB/PB/PL, AM/FM/CD cassette, a/c, \$9,950. 256-230-0806
- ★ 1995 GMC Serria Z-71 extended cab, garage kept. 931-937-6518
- ★ 1990 Chevrolet truck S-10, 5-speed, AM/FM/CD, a/c, \$1,000. 256-746-8289
- ★ 1994 Honda Accord EX, leather interior, sunroof, automatic, air, 54K miles, \$6,000. 882-7011
- ★ 1985 "Honey" motor home, bathroom, shower, kitchen, microwave, stove, refrigerator, A/C, 64K miles, \$6,000. 881-8674
- ★ 1994 Lincoln Continental, Executive Series, 135K miles, new tires, garaged, \$3,570. 772-8718

Wanted

- ★ Carpool or driver in Scottsboro area. 544-1990
- ★ Original Nintendo NES console, cheap, must work well, games/controllers not required. 230-2521
- ★ Electric stove, 30". 828-6551
- ★ Electric guitar with or without amplifier; bass guitar with or without amplifier. 880-1457

Free

- ★ Gray Tabby kitten, 3 months old. 881-8674

Lost

- ★ Keys in Bldg. 4203 area on Oct. 14. Please call 544-2214 if found
- ★ Five diamond gold band in Bldg. 4471 or North parking lot, West end. 256-714-8424

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